

**ABSTRACT OF THE DISCLOSURE**

A method and system for using chromatic dispersion (CD) to encrypt and decrypt data transmitted between a source and a destination domain over an insecure transmission system. In one aspect, a chromatic dispersion encrypter (CDE) in a source domain induces upon data a first CD, thereby encrypting it, prior to transmitting the data on the insecure transmission system. A second optical device, herein called a chromatic dispersion decrypter (CDD), in a destination domain receives the data off the transmission system and induces upon the data a second CD, which is substantially the negative of the first CD, thereby decrypting it. The first and second optical devices may include etalon-based optical assemblies. In another aspect, the ripple amplitude and the ripple period of the CD profile configured on the first optical device is selected based on the data rate of the transmission system, thereby strengthening the encryption.

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